



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

PROGRESS IN NAVAL ARMAMENT.

SOME years ago I prepared for the NORTH AMERICAN REVIEW an article on "Systems of Offense and Defense in Naval Warfare." Since then much has been said in regard to progress in this matter, because of the intense interest the subject excites in all maritime countries.

Let me first draw attention to what I feel to be an important fact, and one that appears to have hitherto escaped notice. It is that the proud superiority in naval warfare claimed by England and America, on account of the boasted superior prowess of their seamen, will be seriously tested in any future war in which they may be engaged, for the simple reason that powerful artillery, well served, must take precedence of the finest seamanship in deciding the result of a naval battle. It is obvious that the glorious sailor-like maneuvers of Lord Nelson, by which the victories of Trafalgar and the Nile were won, can never again be put into execution, because in place of the sailing line-of-battle ship so splendidly handled as it was under canvas, there is now the huge iron-clad, easily moved under steam in all directions, which will be assisted in its work of destruction by new weapons, such as the ram and the torpedo. Who, then, can predict what will be the result of the next naval engagement? That good sea-legs, skill at the wheel, and presence of mind—qualities for which seamen of the Anglo-Saxon race are still so celebrated—will always tell in a struggle at sea, is not to be denied; but it cannot be kept too prominently in view that overconfidence in such matters may lead to the most disastrous results. It should be borne in mind that the smallest rope accidentally fouling the screw, may deprive the ship of her maneuvering power at a critical moment; or a shell penetrating the boiler from the unprotected deck above, may completely disable her. In either of such cases, how unavailing would be the qualities

above mentioned in the crew of the vessel thus virtually put *hors de combat* ! I merely mention these facts as a warning to the overconfident, who, trusting to traditions, may think it not necessary to keep naval progress close to the heel of invention, especially as regards the construction of ships and their armament.

Let us now see what has been done to ships and their armament in the way of alteration during the past few years, amongst the naval powers of the world. Generally speaking, a feverish anxiety is manifested in every country to increase the naval strength. In some, progress is taking the direction of torpedo-vessels, the idea being that a host of pigmy assailants is more than a match for the strongest giant. In others, the swift cruiser with long-reaching weapons is the favorite system, the intention being in case of war to avoid any direct encounter with the naval strength of the enemy, while harassing it by unexpected attacks in isolated quarters. Other governments, again, are for creating a formidable line of defense, which shall be at the same time most powerful for attack ; and so increased thickness of armor and a larger caliber for guns is the order of the day.

Naval preparations, in fact, are being pushed on with a rapidity that almost takes one's breath away, and raises the question, To what purpose is all this expense being incurred ? A glance at the general condition of naval matters shows clearly that the supremacy of England is threatened ; and that a short time hence, without great exertions on her part to increase her navy, a coalition of two or more of the European powers would prove too much for her at sea. It is true that she still heads the list in respect to number of iron-clads, but it is admitted on all sides that her guns are much inferior to those used by some other nations. Her naval authorities, who obstinately clung to the muzzle-loading system long after it had been abandoned by other governments, have had to acknowledge this discreditable fact at last, and in all haste efforts are now being made to recover the lost ground. But the heavy guns of the present day, with their composite construction, require much time and care for their completion, and it will be (I use the words of an English naval officer of the highest rank and position) the end of 1885 before the new and essentially necessary breech-loaders have taken the place of the obsolete muzzle-load-

ing artillery with which the English iron-clads are still armed. These new guns will not have greater range, but will be much lighter in proportion to their caliber than the old, on account of the adoption of a new principle in their construction, that of steel tape for the coils, instead of rings of solid metal. The great advance, then, that has been at last made by England is in the direction of naval artillery. I am willing to admit that the system of enrolling the crews of ships, and the disciplining and training of men, as practiced in the British navy, is all that it should be. The thoughtful consideration, also, given to the general requirements of ships, fleets, and squadrons, by the naval authorities, is not surpassed by those of any other nation. As a proof of this, I may cite the attention now being given to the question of how to protect boilers from the effects of a plunging fire. One idea that appears to have found favor, is that of having immediately over the boilers a sort of double deck, the space between to be filled either with water or some elastic substance, such as cork.

As a preface to what I have to say about the naval strength of France, I will quote a passage from an official statement that has lately come under my observation: "Muzzle-loading guns are entirely obsolete in the French navy, except for saluting purposes at dock-yards." The breech-loading gun, in fact, has long ago replaced the muzzle-loader in the French navy; and to this point of superiority over the British must, in my opinion, be added another, the larger number of vessels built expressly for ramming. Now the ram I hold to be one of the most powerful weapons of attack that could well be devised; but to make it really available in the way I would propose, the vessel so armed should be of special construction, and fitted with no other armament. To arm such vessels with heavy guns, as the British government has done in the case of the only two vessels in its service that bear the designation of "ram," is a great mistake, as it tends to give them a position in the fleet that they ought never to occupy. Their formidable armament makes essentially fighting ships of them, and in a general action it would be difficult to guard against their guns being used to the prejudice of their real weapons, the terrible plate-ripping spurs attached to their bows. Whilst serving the guns, the opportunity for using the ram would often be lost, owing to the difficulty of making out the movements of the enemy through the thick cloud of smoke

that they themselves would create. In respect to rams, I would suggest that they should carry nothing in the way of artillery but a few machine guns, so that the attention of those in command in time of war might never be diverted from the real purpose for which those vessels are constructed. The use of a ram in battle, wanting as we are in experience, is at present a matter of opinion. According to my own ideas, which I find are shared by much more capable men, such vessels would prove of the greatest possible service. I even think that their employment will go as far to revolutionize the conditions of naval warfare as has the introduction of breech-loading guns and rifles those of fighting ashore; and that the naval power that has neglected to provide itself with such means of attack will have as rude an awakening to its folly, should it ever be at war with another, as did the Austrians at the battle of Sadowa, when the despised needle-gun gave the Prussians the victory. Let the reader imagine a squadron of such vessels attached to a fleet engaged with an enemy. Watching every movement, they could be held in readiness for a rush at the propitious moment, and many such moments must necessarily be offered by the chances of battle. A vessel hotly engaged, enveloped in the smoke of her own as well as the enemy's guns, could hardly keep such a watchful eye around her as to be able to maneuver in time to escape the blow of one of these formidable antagonists. A pair of them acting together might attack from opposite directions, in which case the effort to avoid the one would throw the enemy into the path of the other. Again, any iron-clad separated from her consorts, or disabled in the engine-room, would inevitably fall a prize to the ram squadron, or pay the penalty of resistance by sinking beneath their blows. I need not continue further, for any sailor or person accustomed to maneuver ships must see the immense advantage to a fleet of having two or three rams attached to it. The French authorities are evidently convinced of the value of ramming as a mode of attack, and, in the construction of their new iron-clads, have been giving special attention to power in this direction. I find in the official list no fewer than fourteen vessels set down as rams, and seeing their size, weight of armor-plating, and speed, as well as armament, one cannot help being struck with their efficiency as fighting craft.

Having shown what I believe to be the best point of the French navy, I will now speak of what I consider to be its weak

ones. Of these, the principal, in my opinion, is the practice of mounting the guns too high. Nearly every French iron-clad carries her guns *en barbette*, or in batteries placed so far above the water-line as greatly to impair the stability of the vessel in a sea-way. With any swell, these vessels roll to such a degree that it is almost impossible to use their guns. This plan of arranging the armament my experience tells me is a fatal error, which some day may cost the French very dear. It is curious to note that, whilst in England the object sought apparently is to have the guns as low as possible, in France the endeavor seems to be to mount them as high as the construction of the vessels will allow. The value of "all round" fire is duly appreciated in both countries; but while the French obtain the facilities in their system of barbettes, turrets, and sponson batteries, the British obtain them by their indented ports and revolving turrets, combined with a low free-board. The French are making every effort to perfect the training of their naval officers and seamen. Evolutionary squadrons are constantly at sea, accompanied by rams and torpedo-boats, and I doubt not that, should their services be unhappily called into requisition by a European war, the French iron-clads would play a gallant part and prove most formidable antagonists.

Although there is a great deal of talk about Russia's huge iron-clads, both built and in course of construction, and it is a fact that she takes the lead of all the powers in respect to number of torpedo-boats, I cannot think there is much to fear from her fleet, when such vessels as the *Peter the Great* and the two *Popoffkas* are amongst its most formidable items. Much might be said in adverse criticism of the Russian navy, especially in regard to the construction of its iron-clads and their armament. But my acquaintance with many of its officers, for whose pluck and seaman-like qualities I have the highest respect and admiration, prevents me from making what in my peculiar position might be considered invidious remarks. I will therefore confine my observations to the fact that, although Russia may not possess a powerful fleet with which to encounter an enemy at sea, she is fast preparing a most formidable system of coast defense. She has adopted both the Whitehead and the Lay system of movable torpedoes, and the number of small craft specially built for the use of such weapons has now reached one hundred and twenty, against England's one hundred and nineteen. Several of these boats have been passing up the Bosphorus lately. They

are apparently fine sea-going craft. It is said that they can steam a thousand miles without visiting a coal depot, and that their speed is seventeen or eighteen knots an hour. Russia, it is well known, has also in view the damage that can be inflicted upon an enemy by crippling its commerce on the high seas. The national fleet is intended to play the part of Alabamas. It consists for the moment of four large ocean steamers of fair speed, but not extraordinary in that way. They would, as far as I have seen them, meet with more than their match in any of the regular British liners, though doubtless the slow-going class of steamers would suffer from their operations.

Germany has made immense progress of late years in naval matters. She is no longer in the same position as when the war broke out between her and France, and if the same rate of advance be maintained, it will not be long before she will have to be placed amongst the first-class naval powers. New vessels are being constantly built, and these, as well as those already afloat, are armed with the most perfect if not the most powerful guns in the world. Although they have (unwisely, as I think) not yet determined to adopt rams specially built, as adjuncts to to their fighting squadron, the Germans possess eight or ten of what they call armored gun-boats, which would undoubtedly prove most serviceable in defensive operations. The German naval authorities are not ashamed to follow the example of England, which country they candidly admit to be at the head of naval powers in respect to the discipline, training, and general organization of fleets; and they cover the seas at home and abroad with the all-essential training-ships. But it is in the development of the torpedo as a weapon of war that Germany's progress is most seen. In this she takes the lead of all other countries, not excepting England. The Germans have not forgotten how, in the overthrow of the Austrians, they were rewarded for having had the courage of their opinions and adopted the needle-gun when the rest of Europe was laughing at it. As it was with that old fire-stick, the mother of all the breech-loading rifles that have succeeded it, so it is with the torpedo, in which the Germans see a powerful means of damaging their enemies. They have a very large corps of specially trained men, and such a perfect system of organization for coast defense that in a very few hours after a declaration of war the entrances to their harbors and their coasts in general can be completely blocked

against the approach of the enemy. The German Government was the first to give serious attention to the Whitehead, and has improved upon it; and in the Swartzkopf possesses the most perfect type hitherto known of movable torpedo. By patient investigation and a minute attention to details, the Germans have arrived at results the value of which will be clearly seen in the next war in which they are engaged, more especially in respect to sea-mines and obstructions in general. With them the practice of torpedo warfare is no mere holiday drill. High winds and a rough sea are their favorite conditions, and it is the boast of their torpedoists that they are able to attack an iron-clad under circumstances that would deprive it of the use of its guns. I must confess that I do not hold the torpedo, as a weapon of offense, in so high esteem as some naval authorities appear to.

What there is of the Austrian navy is in good condition. An Austrian man-of-war looks like an Austrian gentleman, well equipped, dignified, and ready for any work that might be expected of it. I cannot help thinking it would be well for the balance of naval power in Europe if the Austrian fleet had four times its present strength. Austria, unfortunately, has done little in the way of ship-building for her navy of late years, so that her iron-clads are all more or less deficient in the points that go to make up a first-class ship of the present day. They are weak in construction, and but slightly armored as compared with the vessels that would form the fighting line of a British or French fleet. The Vienna Government, however, has begun to wake up to the necessity of adding to its naval strength, and I doubt not we shall shortly hear of the keel of more than one formidable craft being laid. One point in which its navy is highly efficient is that of the *personnel*. The seamen are the descendants of those who manned the Venetian fleet of old, and their equal in courage and daring is only to be found amongst the sea-faring people of northern Europe. They are exceedingly well drilled, and the officers know how to handle their ships and fight them, as they showed at the battle of Lissa. In proof of the excellence of the Austrian system of organization and training of naval forces may be cited the fact, that at the recent maneuvers in the Adriatic, two iron-clads that had been in commission only seven days were able to hold their own with the evolutionary squadron that had been cruising about in the

Mediterranean for several months. In addition to the regular navy, the Austro-Hungarian Government has a valuable auxiliary force in the ships of the subsidized Lloyd's company. The vessels are all strong enough to carry an armament of light guns, and in time of war they could be utilized either as cruisers for the destruction of the enemy's commerce, or to convey torpedo-boats about, as did the Russian steamer *Constantine* during the late war.

Italy, while experiencing the greatest difficulty in meeting her financial engagements, spends fabulous sums in the construction of huge iron-clads and enormous unwieldy guns, besides adding almost daily to her torpedo flotilla. Italy, in fact, is making greater efforts toward the attainment of naval supremacy than even England, although, in my opinion, she has chosen anything but the proper path. The construction of such large vessels as the *Duilio* and *Dandolo*, *Italia* and *Lepanto*, is a repetition of the old mistake of putting all your eggs into the same basket. These ships certainly carry the most formidable armament ever set afloat, but their loading arrangements are so imperfect that while one round is being fired from their guns, half a dozen can be given by an enemy. Between two successive shots of the *Duilio*, a nimble craft with somewhat lighter guns has time to rush in, deliver her fire, and then steam away again out of danger. With all their heavy armor and defensive arrangements in general, the *Duilio* class of iron-clads are by no means to be considered impregnable. There are certain vulnerable points about them, near the bow and stern especially, where a few well-delivered shots would soon render them *hors de combat*. I think one of these Italian vessels, attacked by three or four of the waspish craft recently built by other governments, would have a very bad time of it. Seeing that in the contest between defensive armor and the gun, the victory has always been to the latter, it is highly probable that the days of the heavily armored iron-clad will soon be numbered. It is more than likely that a short time hence an entirely new class of vessel will be looked upon as the proper type of fighting ship; and then, it may be asked, where will be the millions spent so ambitiously by presumptuous young Italy?

So far I have spoken only of the fleets of the great European powers. The other maritime governments are also, each in accordance with the resources at its command, pushing on their

naval armaments. Denmark and Norway and Sweden are chiefly interested in defensive measures, and so are concentrating their efforts upon the increase of their torpedo craft and armored gun-boats. The naval authorities of Denmark, after a series of experiments, the results of which were deemed most satisfactory, have determined upon an entirely new construction, and are now engaged in building a number of ram-gun-boats with cupola decks. The armor is to form a shield over the vessel, so as completely to protect the engines and boilers from a plunging fire. These craft will be very formidable, as they are to have a high rate of speed, and in addition to the ram are to carry torpedoes.

Greece is another small country very ambitious to possess a respectable navy. The Hellenic Government has decided to construct four very powerful armored corvettes, and the money for them having been provided, a special commission is now studying the plans and tenders sent in by the various ship-building firms in Europe.

The United States, according to my views, is pursuing a wise and sensible course in regard to her naval armament. She sends into foreign waters fine, large, warlike-looking corvettes, vessels of high speed, heavily armed, and well officered and manned. By this means the *personnel* of the navy receives just the training necessary for carrying on such a war of defense and reprisal as would best serve America's interests in a war with another maritime power. Fast cruisers and torpedo-boats are all that America needs; the one to prey upon the enemy's commerce, and the other to keep its iron-clads off her shores. Situated as they happily are, far removed from the spheres of European politics, the American people can afford to look on quietly while the arming of Europe is going on.

The total number of armored vessels possessed by the European powers, including those in course of construction, is three hundred and fifteen; of which sixty-three belong to England, sixty-eight to France, thirty-one to Germany, thirty-nine to Russia, nineteen to Italy, thirteen to Austria, nineteen to Turkey, twenty-three to Holland, twenty to Sweden and Norway, nine to Denmark, seven to Spain, one to Portugal, one to Roumania, and two to Greece. It must be understood, however, that amongst these iron-clads are reckoned all the gun-boats, so that a high number does not necessarily imply a powerful fleet. The

apparent disparity would be removed by a close examination of the vessels, and a real comparison of the relative strength of the various navies of Europe would place them much as they stand in the above statement, so far as guns and armor are concerned. Although the number of European iron-clads is thus set down as three hundred and fifteen, a certain percentage must be taken off on account of the non-effective vessels, the number of which will greatly increase within the next few years. At present two hundred and twenty-six only of the iron-clads are fit for service. Of these, fifty-seven belong to the English fleet, forty-five to the French, twenty-four to the German, twenty-one to the Russian, thirteen to the Italian, ten to the Austrian, fourteen to the Turkish, eighteen to the Dutch, eight to the Danish, five to the Spanish, eight to the fleets of Norway and Sweden, two to that of Greece, and one to the Portuguese. Thus it is seen that in spite of the numerical difference of five ships in favor of France, England still maintains her old position as the first naval power of Europe. France, however, is running her very hard, and a few years hence, if the present conditions of naval progress in the two countries remain unchanged, she will be quite alongside, if not ahead, of her ancient rival; for the iron-clads now in course of construction will then all have been completed and added to the respective navies, while many others will have been removed from the lists, as vessels of obsolete construction, unfit for further service. The fleets of Europe would then stand much as follows: The English forty-seven iron-clads, the French forty-five, the German twenty-three, the Russian eleven, the Austrian nine, the Dutch seven, the Italian eight, the Turkish nine, and the Danish five. About the year 1890 the French fleet will be quite a match for the English, a circumstance deserving the highest attention on the part of the British Government, seeing that it will never be possible to concentrate the whole strength of its navy in the Channel, owing to the necessity of protecting its many interests elsewhere. In fact, England's prospects of ruling the waves in future as of old, are anything but bright. Germany, on the other hand, is coming rapidly to the front, and at the date mentioned will probably be in a position not only to enforce respect from England and France as a first-class naval power, but to keep the sea in face of any naval combination that the Baltic powers can bring against her.

I cannot close this paper without some remarks upon a naval weapon regarding which all the world seems to be going mad. I have some right to do so, because I am, perhaps, the only man living in Europe who has had, while commanding a fleet, the unpleasant experience of being hunted and frequently attacked by squadrons of torpedo-boats. My experience during the Russian war has led me to depreciate the existing torpedoes as weapons of offense, and I look upon them as valuable only for their moral effect. The Turkish vessels under my command during the late war were attacked at various times by the Spar, the Harvey, and the Whitehead torpedoes. In two instances only were they successful, and that solely on account of neglect of the orders given in respect to the precautions to be taken for the protection of the vessels. Both the Harvey and the Whitehead signally failed when employed by the Russians in the Black Sea, the one at Soukhoun Kalch and the other at Batoum. It was only on the Danube, and owing to the absence of guard-boats and anything like a "crinoline" protection of spars and ropes, that a steam-launch with a spar torpedo was able, on one occasion, to effect the destruction of a small gun-boat. The Whitehead torpedo is very much overrated, according to my way of thinking. Its movements are uncontrollable, and, once launched, everything depends upon the correctness of the aim and the immovability of the target. Experience has shown that there is no chance of a hit where the range is over five hundred yards, and the lookout must be poor indeed that cannot signal the approach of a hostile craft before she arrives within that distance.

Although it is now the fashion to fit iron-clads for the use of the Whitehead torpedo as a part of their armament, I do not think for a moment that they will ever be launched from ships when fighting in anything like a formation, as would be the case in a general action, on account of the danger of striking a consort instead of the enemy. Their use I would restrict to special vessels that could afford to wait the opportunity for launching a torpedo under conditions that would insure success. The Lay torpedo I consider to be a much better weapon than the Whitehead for attacking ships when passing through narrow channels, on account of the perfect command that the electrical steering gear gives the operator over its movements. It ought, how-

ever, to possess more speed and a greater degree of invisibility than were shown during the experiments carried out some years ago in the Bosphorus. To produce a really serviceable locomotive torpedo, the following conditions must be fulfilled: First, a high rate of speed, and an effective range of not less than a mile; secondly, invisibility, or, what would answer the same purpose, such a system of construction as would be a guarantee against its sinking from the effects of Nordenfelt projectiles or shell fire; thirdly, perfect command over its movements, so that a change of aim might be made at any moment during the run; and, fourthly, one of the most important conditions of all, the capability of conveying and exploding charges of gun-cotton or dynamite at least twice as heavy as those now carried by the Whitehead, at depths greater than those to which the armor belts of iron-clads are likely to extend. All these conditions General Berdau declares his system of locomotive torpedoes will fulfill. He has been experimenting at Constantinople for some time past, and is still confident of success. I offer no opinion, either on this point or on the system he is engaged in perfecting, but will confine my remarks to saying that should he really succeed in producing a weapon that can do all he claims for it, the conditions of naval warfare will be completely revolutionized.

HOBART PASHA.